



Polarstern moored to an ice floe during the ArcWatch-1 expedition. Researchers set up measuring instruments on the ice and take samples to study the effects of climate change on the Arctic.

72 Max Planck researchers collaborate with partners in more than 120 countries. In this article, they write about their personal experiences and impressions. Christina Bienhold from the Max Planck Institute for Marine Microbiology in Bremen spent two months on the research icebreaker *Polarstern* in the central Arctic. As co-leader of the ArcWatch-1 expedition she reached the North Pole in summer 2023.

90° 00' N. Light fog. Around us, a mosaic of ice floes and open water, just like in most areas of the summery Arctic Ocean nowadays. However, a glance at our ship's positioning system proves that we are at the North Pole! *Polarstern*, which was launched in early 1982, has reached the northernmost point of the globe for the seventh time. It's a first for me and most

others on board. Researchers and crew stand on the bridge, clapping. The ship's horn sounds. There is champagne. Our chief scientist Antje Boetius and our captain Stefan Schwarze give a speech.

The polar regions and the deep sea have fascinated me since I was a child. My father is a biologist and worked in politics in Bremen. As part of his job, he was in contact with many of the marine research institutes. I often flicked through annual reports of the institutes in his office and dreamed of becoming a marine researcher one day. While still at school, I got my first hands-on experience as an intern at the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI).

Today, I am actually a scientist and research bacterial communities of the deep sea floor. By using various elements such as carbon to generate en-

ergy, microorganisms of the deep sea play an important role in global element cycles. So far, however, we know little about which species occur in the Arctic depths, how communities are changing as a result of climate change, and how this affects matter turnover. Therefore, we urgently need to conduct surveys at regular intervals to capture the changes. For this purpose, we collect sediment samples from the seabed. Using genetic analyses, microorganisms in the sample can later be identified in the laboratory.

Polarstern is the largest ship in the German research fleet. In 2012, I was already part of an expedition to the central Arctic to collect sediment samples. Last summer, I had the opportunity to accompany the ArcWatch expedition to the North Pole as a co-chief scientist. A total of 54 scientists and 43 crew members from 15 countries participated in the expedition. To make the best use of time, we

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worked in shifts – day and night. The continuous daylight of the Arctic summer proved advantageous here.

Technically, we were well equipped on Polarstern. We had a multiple corer to collect sediment samples. A modern towed camera system allowed us to film at great depths. Our expedition thus succeeded in providing the first images of the seafloor at the North Pole. Sponges, sea cucumbers, fish, and cephalopods – the Arctic deep sea is teeming with life! Especially common are the spoon worms, which collect small food particles from the sediment and leave characteristic star-shaped traces in their wake.

Overall, the expedition was a great success – despite considerable challenges with the ship's technology. The bow thruster was defective, so we lacked an important maneuvering element to position the ship. To stop for our ice stations along the way, we had to im-

provise and moor Polarstern to a floe with the help of an ice anchor. Despite the difficulties, we were able to accomplish large parts of our tightly scheduled research program. We did not have much free time, but we were still able to use it in a variety of ways. On board there is a swimming pool and a sauna, a gym, and the ship's bar "Zillertal." We even had a band that formed on board, the ArcWatchers. The atmosphere was excellent!

Since the 1980s, the Arctic has lost 12 percent of its summer sea ice per decade – an area almost the size of India. These changes have repercussions down to the deep sea, about which we still know so little. I want to change that with my research. My family supports me in this: while I was at sea for two months, my husband and the grandparents took care of the children. They are five and eight years old. I hope I can pass on some of my fascination with the oceans to them.



PHOTO: PERSONAL

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43, is a marine biologist and conducts research in the HFG-MPG bridge group for deep-sea ecology and technology – a collaboration between the Max Planck Institute for Marine Microbiology and the Alfred Wegener Institute, Helmholtz Centre for Polar and Marine Research (AWI). Her work focuses on the microbial ecology of the Arctic and the deep sea.